ScienceBlog

Astronomers Trace Microquasar's Path Back in Time
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From the National Science Foundation's Very Long Baseline Array :

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Using precise positional data from the National Science Foundation's Very Long Baseline Array (VLBA) and from optical telescopes, Felix Mirabel, an astrophysicist at the Institute for Astronomy and Space Physics of Argentina and French Atomic Energy Commission, and Irapuan Rodrigues, also of the French Atomic Energy Commission, calculated that Scorpius X-1 is not orbiting the Milky Way's center in step with most other stars, but instead follows an eccentric path far above and below the Galaxy's plane.

Scorpius X-1, discovered with a rocket-borne X-ray telescope in 1962, is about 9,000 light-years from Earth. It is the brightest continuous source of X-rays beyond the Solar System. The 1962 discovery and associated work earned a share of the 2002 Nobel Prize in physics for Riccardo Giacconi.

Mirabel and Rodrigues used a number of published observations to calculate the path

of Scorpius X-1 over the past few million years.

"This is the most accurate determination we have made of the path of an X-ray binary," said Mirabel.

By tracing the object's path backward in time, the scientists were able to conclude that the neutron star and its companion have been traveling together for more than 30 million years. They also speculated on the birthplace of Scorpius X-1.

"The neutron star, which is the remnant left over from the supernova explosion of an even more massive star, either came from the Milky Way's disk, or from a globular cluster at a considerable distance from the disk," said Rodrigues. Globular clusters are clumps of millions of stars in the outskirts of the Galaxy.

If it came from the Galaxy's disk, the scientists say, it would have had to receive a powerful one-sided "kick" from the supernova explosion to get into its present eccentric orbit. While this is possible, they conclude that a more likely scenario is that the neutron star came from a globular cluster.

"Probably, this neutron star picked up its companion and was thrown out of its globular cluster by a close encounter with other stars at the cluster's core," Mirabel said. The scientists published their results in the January 30 issue of the journal Astronomy and Astrophysics.

The same pair of researchers traced a similar path of a black hole and its companion star in 2001. Also that year, other astronomers produced a "movie" showing motions in the jet of material ejected from the disk around Scorpius X-1's neutron star.

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